

(August 4, 2003)

Membrane Waterproofing System A Membrane

The membrane shall be factory-laminated sheet composed of either suitably plasticized coal tar or rubberized asphalt reinforced with polypropylene fabric or added polyester fibers. It shall be manufactured free from blemishes, discontinuities, and other defects. The membrane shall be supplied in rolls, having a minimum width of 0.9 meters, and shall conform to the following requirements:

Thickness:	1650 micrometers minimum
Pliability (1):	No cracks

- (1) Place a 100 millimeter by 25 millimeter membrane specimen in a 23C cold chamber for two hours. While still in the cold chamber, bend the specimen 180 degrees over a 25 millimeter radius mandrel. Remove specimen from cold chamber and inspect for cracks.

Membrane Waterproofing System B Membrane

The membrane shall meet the following requirements:

Viscosity, SFS at 177C	ASTM E 102	950-1350
Softening Point, C	ASTM D 2398	74 Min.
Adhesion, kPa	ASTM D 429(1)	103 Min.
Cold Bend Test, at -23C		(2) No cracks
Compatibility with Asphalt		Complete

- (1) Adhesion ASTM D 429, Method A(Modified). The Contractor shall perform the following tension test of vulcanized rubber bonded to steel:

Coat the surfaces of the 2 metal plates described in the procedure with an epoxy resin of at least 13.8 MPa tensile strength. Stand the coated ends on Ottawa sand (ASTM C 109). Apply a force of 44.5 newtons for a minimum of eight hours to ensure adequate bedding of the sand in the resin. Brush all loose particles from the treated metal surface and coat each with 0.3 grams of primer.

Cover the bottom of a cylindrical thin film oven test pan (ASTM D 1754) with a release paper such as Technipeel No. 985 made by the Brown Paper Company of Kalamazoo, Michigan. Any release paper that retains its release properties after use is satisfactory.

Pour 50 grams of membrane (at 177 to 190C) into the release-treated pan. Allow the membrane to cool to ambient temperature. Remove it from the pan and cut circular sections to fit the metal plates or discs coated as above.

Fit the circular section of membrane on one metal disc and place the other metal disc over it. Put this sandwich in a 60C oven. Place a 1 kilogram weight on it and leave in the oven for two hours.

Test in accordance with ASTM D 429, Method A, and calculate adhesion as total load at failure divided by area of adhered surface,

1	whether failure occurred at bonded surface or within the membrane
2	material.
3	
4	(2) Cold Bend Test. The Contractor shall perform the following test:
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6	Pour 50 grams of membrane into a container, as described for the
7	adhesion test. Allow it to cool to ambient temperature and remove
8	from the pan.
9	
10	Dust both sides lightly with talc to prevent stickiness.
11	
12	Place the specimen in a -23C cold chamber for two hours. While still
13	in the cold chamber, bend the specimen 180 degrees over a radius
14	not to exceed 25 millimeters.
15	
16	Remove the membrane from the cold chamber and check for cracks.
17	Only material which shows no cracks will be considered satisfactory.
18	
19	Membrane Waterproofing System C Fabric For Membrane Protection
20	The fabric shall be a polypropylene material having the following properties:
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22	Tensile strength, either direction, min. 210 newtons (WSDOT Test Method
23	916)
24	
25	Mass 100 - 200 grams per square meter
26	Width min. 0.9 meters